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IS 8383 (2000): Hydraulic Fluid Power - Filter Elements - Verification of Fabrication Integrity and Determination of the First Bubble Point [PGD 16: Fluid Power]



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भारतीय मानक

द्रवचालित तरल शक्ति — फिल्टर एलीमेंट — संविरचना
अभिन्नता की जाँच और प्रथम बुलबुला बिन्दु का निर्धारण
(पहला पुनरीक्षण)

Indian Standard

HYDRAULIC FLUID POWER — FILTER ELEMENTS —
VERIFICATION OF FABRICATION INTEGRITY AND
DETERMINATION OF THE FIRST BUBBLE POINT
(*First Revision*)

ICS 23.100.60

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Hydraulic Fluid Power Systems Sectional Committee had been approved by the Basic & Production Engineering Division Council.

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. Filters maintain fluid cleanliness by removing insoluble contaminants. The filter element is a porous device which performs the actual process of filtration.

This Indian Standard was first published in 1974 based on International Standard ISO 2942 : 1974 'Hydraulic fluid power — Filter elements — Verification of fabrication integrity and determination of the first bubble point'. Consequently ISO Standard was first revised in 1985 and again in 1994. The Sectional Committee dealing with the subject therefore decided to revise this standard and bring it in line with latest ISO standard.

Following are the major changes made in this revision:

- a) Amendment No. 1 has been included,
- b) Reference clause has been added,
- c) Test procedure has been modified, and
- d) Figure 1 has been modified.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard

Indian Standard

HYDRAULIC FLUID POWER — FILTER ELEMENTS — VERIFICATION OF FABRICATION INTEGRITY AND DETERMINATION OF THE FIRST BUBBLE POINT (*First Revision*)

1 SCOPE

1.1 This standard specifies a bubble point method of test for verifying the fabrication integrity of oil hydraulic fluid power filter elements by the first bubble point.

1.2 This standard is not intended to be used for measuring efficiency of filter elements.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
7513 : 1974	Graphical symbols for fluid power systems
10416 : 1992	Fluid power systems and components — Vocabulary (<i>first revision</i>)

3 DEFINITIONS

3.1 For the purpose of this standard, the definitions given in IS 10416 shall apply.

3.2 Other definitions related to this Indian Standard are:

3.2.1 *Fabrication Integrity* — The physical acceptability of a filter element relative to that designated by the filter manufacturer.

3.2.2 *First Bubble Point* — The pressure at which the first bubble appears when a filter element is tested using the method specified in this international standard. In the absence of manufacturing defects, this value is related to the largest pore of the filtering medium.

4 GRAPHIC SYMBOLS

Graphic symbols used are in accordance with IS 7513.

5 TEST EQUIPMENT AND MATERIAL

5.1 Bubble point testing apparatus as shown in Fig. 1.

5.2 Compressed Air Supply

With filter(s) and pressure regulator(s), adjustable for values from the minimum up to 10 kPa (100 m bar).

5.3 Pressure Measuring Device

With a relative accuracy of ± 3 percent.

5.4 Leakproof Container

For submerging the filter element under test, fitted with a thermometer and a built-in manual or automatic mechanism for rotating the filter element.

5.5 Reference Liquid

Clean isopropanol or an alternative liquid designated by the filter element manufacturer. The cleanliness of liquid as well as air used is to be consistent with subsequent test requirements.

6 TEST PROCEDURE

6.1 Check that the filter element to be tested complies with the manufacturer's drawing(s).

6.2 Install the clean filter element in the bubble point testing apparatus (5.1), with the major axis of the filter element parallel to the surface of the reference liquid (5.5).

6.3 Submerge the element until it is covered by $12 \text{ mm} \pm 3 \text{ mm}$ of the reference liquid at a temperature of $22 \pm 5^\circ\text{C}$.

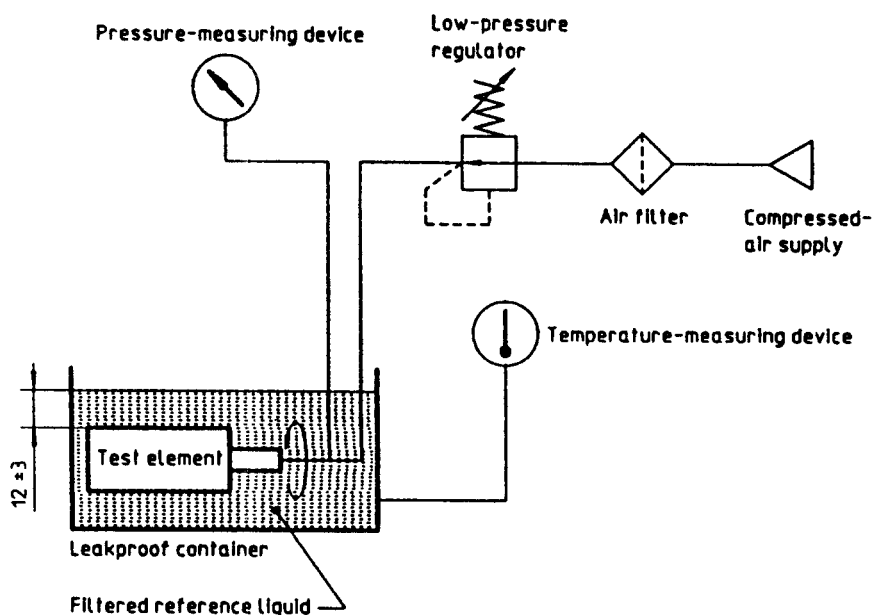
6.4 Allow the filter element to remain submerged in the liquid for 10 min before proceeding.

NOTE — The arbitrary 10 min soak is to ensure that the filter element is wetted.

7 VERIFICATION OF FABRICATION INTEGRITY (ABSENCE OF AIR BUBBLES)

7.1 Apply air pressure to the inside of the filter element at the value designated by the filter manufacturer.

After filling the test element with air, re-adjust the



All dimensions in millimetres.

FIG. 1 TYPICAL BUBBLE POINT TESTING APPARATUS

depth of liquid covering the element to 12 ± 3 mm.

NOTE — Air bubbles may be trapped on or within the outer structure of the filter element, resulting in a few spurious bubbles. These bubbles should be ignored. A steady stream of bubbles at the manufacturer's designated value is the only consideration.

7.2 Rotate the filter element through 360° about its major axis while applying the air pressure as indicated in 7.1.

7.3 The acceptance criterion is that there shall be no evidence of bubbles at the pressure specified by the manufacturer.

8 DETERMINATION OF THE FIRST BUBBLE POINT

8.1 Apply air pressure progressively to the inside of the filter element while rotating it about its axis (as indicated in 7.2) increase the pressure by steps of 50 Pa (0.5 mbar) beginning at zero pressure.

Stop the pressure rise as soon as the first bubble point appears as a regular flow. Record the corresponding pressure.

NOTE — Air bubbles may be trapped on or within the outer structure, resulting in a few spurious bubbles. These bubbles should be ignored. The first bubble appears in a regular flow as long as internal air pressure is maintained. Adequate lighting is required for reliable observation. Increase air pressure slowly to

allow the establishment of equilibrium and to prevent overshooting. Avoid mechanical vibration or jarring of the test element to prevent upsetting bubble equilibrium which causes erroneously low pressure readings.

8.2 Completely release the air pressure in the filter element to allow the pores to be flooded with liquid and repeat the procedures given in 8.1.

8.3 Repeat the operation two more times and record the corresponding pressures.

9 TEST RESULT

9.1 Record the result of the verification of fabrication integrity and the data for the determination of the first bubble point in accordance with the typical test report given in Annex A.

9.2 The pressure at which the first bubble emerges shall not be less than the value specified by the manufacturer.

10 CLASSIFICATION OF TESTS

10.1 The method of test for fabrication integrity of oil hydraulic filter element given in this standard shall be considered as a routine inspection test on a suitable sampling basis to be agreed between the manufacturer and the user.

ANNEX A*(Clause 9.1)***TEST REPORT FOR FILTER ELEMENT FABRICATION
INTEGRITY AND FIRST BUBBLE POINT**

Date: _____

Operator: _____

Reference liquid: _____

Surface tension: _____

Test temperature : _____ °C

Filter Element

Manufacturer: _____

Manufacturing No.: _____

Batch No.: _____

Type: _____

Material: _____

Fabrication Integrity

Appearance of a regular flow of bubbles: Yes No

at the pressure of _____ Pa, as specified by the manufacturer

First Bubble Point (optional)

Pressure measured when the first bubble appears as a regular flow:

1st reading: _____ Pa

2nd reading: _____ Pa

3rd reading: _____ Pa

Filter element fabrication integrity verified and first bubble point determined in accordance with IS 8383 : 2000
 'Hydraulic fluid power — Filter elements — Verification of fabrication integrity and determination of the first
 bubble point (*first revision*)'.

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Amendments Issued Since Publication

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